

REMARKS

Status of the Claims

Claims 1, 3-16, and 18-20 are pending in this application.

Claims 1-7 and 16-20 are rejected.

Claims 2 and 17 have been cancelled.

Claims 8-15 have been withdrawn, without prejudice.

Claims 1 and 16 have been amended. Support for these amendments can be found throughout the specification, claims, and drawings, as originally filed.

Claim Objections

Claims 1 and 16 were objected to because in line 2 of claim 1 and in line 3 of claim 16, "the transmission" should be changed to "a transmission." Claims 1 and 16 have been changed to read "a transmission," Applicant believes this objection has been obviated, and that no new matter has been added.

Rejection of Claims 1-7, 16, and 18-20 Under 35 U.S.C. § 103

Claims 1, 2, 6, 7, 16 and 17 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,612,959 issued to Frost (hereafter Frost '959) in view of U.S. Patent No. 5,511,639 issued to Sherman (hereafter Sherman '639). In order for the proposed references to be relied upon, a person having ordinary skill in the art at the time of the invention must have been motivated to modify and combine the references based upon the teachings of those references. Applicant requests reconsideration of the rejection based on the following remarks.

With regard to claims 2 and 17, the Office Action stated it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the transfer case/gear box of Frost in view of Sherman in order to provide an improved power transmission and control.

Claims 1 and 16 both have been amended to include the features of claims 2 and 17. Claims 1 and 16 now recite, *inter alia*, that the gear box combines with the transmission of the vehicle to extend the gear ratio range of the vehicle by providing an underdrive gear ratio and a direct drive gear ratio or an overdrive gear ratio and a direct drive gear ratio in addition to gear ratios provided by the transmission, and that the input shaft is coupled to the ring gear, the output shaft is coupled to the carrier and the sun gear is coupled to the first set of clutch plates and the drum, and wherein engaging the band couples the sun gear to ground to provide the underdrive gear ratio from the ring gear through the carrier to the output shaft, and wherein activating the clutch assembly couples the sun gear to the ring gear to provide the direct drive gear ratio from the input shaft to the output shaft.

Frost '959 teaches a transfer case having an input shaft 24 driven by an output shaft of transmission 20, a rear output shaft 26, a planetary gearset 28, and a powershift clutch assembly 30 which can be selectively actuated to engage gearset 28 for establishing three distinct drive connections between input shaft 24 and rear output shaft 26. *Col. 3, Lines 22-27*. Frost '959 also teaches that the power shift clutch assembly 30 includes three range clutches which include a first range clutch 82 located between a ring gear 68 and carrier assembly 62, a second range clutch 84 located between housing 60 and first sun gear 64, and a third range clutch located between housing 60 and second sun gear 66. *Col. 3, Lines 62- Col. 4, Line 1*. Frost '959 does not teach or suggest using a band and drum instead of a clutch pack for engaging and

disengaging a clutch/brake assembly, therefore Frost '959 does not teach or suggest all of the elements of the present invention.

Sherman '639 does not make up for the deficiencies of Frost '959 because Sherman '639 teaches away from the present invention. Sherman '639 teaches an improved power transmission and control, wherein, during a ratio interchange, the off-going friction device is controlled in response to the torque capacity of the oncoming friction device. *Col. 1, Lines 63-67*. Sherman '639 also teaches that in many transmissions, the brake assembly 12 might be used to establish a second gear ratio while the clutch assembly 14 is used to establish a third gear ratio. *Col. 4, Lines 22-24*. Sherman '639 teaches away from the present invention in that Sherman '639 specifically teaches a brake assembly specifically for use in a transmission, not for a transfer case. The present invention overcomes making modifications to the transmission, while Sherman '639 teaches modifying the transmission.

Applicant submits that Frost '959 in view of Sherman '639 does not teach or suggest the inventive combinations of claims 1 and 16 as required by 35 U.S.C. § 103(a). Therefore, Applicant respectfully requests removal of the rejection of claims 1, 6, 7, and 16, and allowance thereof.

The Office Action also rejected claims 3-5 and 18-20 under 35 U.S.C. § 103(a) as being unpatentable over Frost '959 in view of Sherman '639 as applied to claim 1 and 16 above, and further in view of U.S. Patent 3,908,485 issued to Miyauchi et al. (hereafter Miyauchi '485).

The Office Action indicated that it would have been obvious to one of ordinary skill in the art at the time the invention was made to change the number of teeth of the gear components in the planetary gear of the combination of Frost and Sherman to have the gear ratios as recited in claim 3-5 and 18-20 since the Examiner takes and

Official Notice that the gear ratio changed by changing the number of teeth of gear components of the planetary gear is old and well known in the art (see Miyauchi et al reference, col. 9, lines 11-14), *see page 5, paragraph 6 of the Office Action*. Claims 3-5 are dependent upon claim 1, and therefore contain all of the features of claim 1, and claims 18-20 are dependent upon claim 16 and therefore contain all of the limitations of claim 16. Claims 3-5 and 18-20 contain the feature, *inter alia*, that the input shaft is coupled to the ring gear, the output shaft is coupled to the carrier and the sun gear is coupled to the first set of clutch plates and the drum, and wherein engaging the band couples the sun gear to ground to provide the underdrive gear ratio from the ring gear through the carrier to the output shaft, and wherein activating the clutch assembly couples the sun gear to the ring gear to provide the direct drive gear ratio from the input shaft to the output shaft.

It has already been shown that it would not have been obvious at the time of the invention to modify Frost '959 in view of Sherman '639, therefore, Miyauchi '485 must make up for the deficiencies of the combination of Frost '959 and Sherman '639, or the rejection will fall.

Miyauchi '485 does not make up for the deficiencies of Frost '959 or Sherman '639, because as with Sherman '639, Miyauchi '485 teaches away from the present invention. Furthermore, the specification and drawings of Miyauchi '485 teach an automatic power transmission and a hydraulic control system. Figure 3 teaches how an automatic power transmission is shown to largely consist of a transmission case which is generally designated by reference numeral 10, a torque converter 12, an oil pump 14, a transmission input shaft 16, a first or front clutch 18, a second or rear clutch 20, first, second, and third planetary gear sets 22, 24, and 26 respectively, a low-and-reverse brake 28, a second-speed coasting brake 30, a second-speed-driving brake 32, a band

brake 34, a low-one-way clutch 36, a second-speed one-way clutch 38 and a transmission output shaft 40. *Col. 6, Lines 41-50.* The specification of Miyauchi '485 teaches different gear ratios for a transmission, it does not teach or suggest the input shaft is coupled to the ring gear, the output shaft is coupled to the carrier and the sun gear is coupled to the first set of clutch plates and the drum, and wherein engaging the band couples the sun gear to ground to provide the underdrive gear ratio from the ring gear through the carrier to the output shaft, and wherein activating the clutch assembly couples the sun gear to the ring gear to provide the direct drive gear ratio from the input shaft to the output shaft as set forth by claims 1 and 16 of the present invention.

Applicant submits that Frost '959 in view of Sherman '639, and further in view of Miyauchi '485, does not teach or suggest the inventive combinations of claim 1 or claim 16 as required by 35 U.S.C. § 103(a). Therefore, the application as amended is not rendered unpatentable under 35 U.S.C. §103(a). Applicant respectfully requests removal of the rejection of claims 3-5 and 18-20 and allowance thereof.

CONCLUSION


It is respectfully submitted that in view of the above amendments and remarks the claims 1-7, 16, and 18-20, as presented, are patentably distinguishable because the cited patents, whether taken alone or in combination, do not teach, suggest or render obvious, the present invention. Therefore, Applicant submits that the pending claims are properly allowable, which allowance is respectfully requested.

The Examiner is invited to telephone the Applicant's undersigned attorney at
(248) 364-4300 if any unresolved matters remain.

Respectfully submitted,

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